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09/696,220	10/26/2000	Masafumi Kokura	925-165	4305

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EXAMINER
AUGHENBAUGH, WALTER

ART UNIT	PAPER NUMBER
1772	11

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Please find below and/or attached an Office communication concerning this application or proceeding.

AS-11

Office Action Summary	Application No.	Applicant(s)	
	09/696,220	KOKURA ET AL.	
	Examiner	Art Unit	
	Walter B Aughenbaugh	1772	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 February 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 7-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Acknowledgement of Applicant's Amendments

1. The amendments made to the abstract made on page 1 of Applicant's Amendment (Paper #10) have been received and considered by Examiner.

2. The amendments made to claims 1-5 and 7-10, made on pages 12-15 of Applicant's Amendment (Paper #10) have been received and considered by Examiner.

3. The cancellation of claim 6 in Paper #10 has been acknowledged by Examiner. New claims 11-14 provided on pages 15 and 16 of Paper #10 have been received and considered by Examiner.

Information Disclosure Statement

4. Examiner has included initialed copies of the PTO-1449 forms dated October 26, 2000 and October 1, 2002, as requested by Applicant.

WITHDRAWN OBJECTIONS

5. The objection to the abstract made of record in page 2, paragraph 1 of Paper #7 has been withdrawn due to Applicant's amendments made in Paper #10.

WITHDRAWN REJECTIONS

6. The 35 U.S.C. 112, second paragraph rejection of claims 1-10 made of record in pages 2-5, paragraph 3 of Paper #7 has been withdrawn due to Applicant's amendments in Paper #10.

7. The 35 U.S.C. 102(e) rejection of claims 1, 2, 4 and 6 as anticipated by Kurogane et al. made of record in pages 5-6, paragraph 5 of Paper #7 has been withdrawn due to Applicant's amendments in Paper #10.

8. The 35 U.S.C. 103 rejection of claim 3 over Kurogane et al. made of record in pages 6-7, paragraph 7 of Paper #7 has been withdrawn due to Applicant's amendments in Paper #10.

9. The 35 U.S.C. 103 rejection of claim 5 over Kurogane et al. in view of Mitsui et al. made of record in pages 7-8, paragraph 8 of Paper #7 has been withdrawn due to Applicant's amendments in Paper #10.

10. The 35 U.S.C. 103 rejection of claim 5 over Mitsui et al. in view of Kurogane et al. made of record in pages 8-10, paragraph 9 of Paper #7 has been withdrawn due to Applicant's amendments and arguments in Paper #10.

NEW OBJECTIONS

11. The amendment filed February 4, 2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the limitations pertaining to"address lines" recited in claims 7 and 11.

Applicant is required to cancel the new matter in the reply to this Office Action.

NEW REJECTIONS

Claim Rejections - 35 USC § 112

12. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

13. Claims 7 and 11 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one

skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The term "address lines" and the limitations pertaining to the term "address lines" constitutes new matter that is not described in the specification.

Claim Rejections - 35 USC § 102

14. Claims 1, 12 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Kurogane et al.

In regard to claim 1, Kurogane et al. teaches a liquid crystal display (LCD) (col. 9, lines 13-15) comprising at least one thin film transistor (TFT) (col. 3, lines 56-59), an interlayer insulator (item 6, Figure 1 and col. 6, lines 3-7) and at least one reflective pixel electrode defining at least part of a pixel of the LCD (item 13, Figure 1 and col. 6, lines 7-11 and col. 9, lines 13-15). Kurogane et al. teaches that the LCD is supported by a substrate (item 1, Figure 1 and col. 5, lines 53-55). Kurogane et al. teaches that the interlayer insulator (item 6) is located at least partially between the reflective pixel electrode (item 13) and the substrate (item 1) as shown in Figure 1. Kurogane et al. teaches a film comprising molybdenum nitride (source/drain electrode line, item 10, composed of aluminum alloy metal film, item 8, and molybdenum nitride film, item 9) formed immediately below and in contact with the reflective pixel electrode, and above and contacting the interlayer insulator, so that the film comprising molybdenum nitride (source/drain electrode line, item 10) is at least partially located between and contacting each of the reflective pixel electrode and the interlayer insulator, as shown in Figure 1.

In regard to claims 12 and 13, Kurogane et al. teaches an electronic device comprising a substrate supporting an insulating layer (surface protective layer, item 11, col. 6, lines 5-8 and Figure 1) and a conductive electrode layer (item 13), a layer comprising molybdenum nitride

(item 9) located between and contacting each of the insulating layer and the conductive electrode layer wherein the layer comprising molybdenum nitride is located below the conductive electrode layer and above the insulating layer so that the insulating layer is between the substrate and the layer comprising molybdenum nitride as shown in Figure 1. Kurogane et al. teach that the electronic device is provided with a plurality of TFTs arranged in a matrix on a substrate (col. 1, lines 13-14), and that the insulating layer is formed partially over the TFTs (Fig. 1).

Claim Rejections - 35 USC § 103

15. Claims 2, 4, 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurogane et al. in view of Mitsui et al.

Kurogane et al. teaches the LCD as discussed above.

In regard to claim 2 and 14, Kurogane et al. fail to explicitly teach that the reflective pixel electrode comprises aluminum. However, Mitsui et al. disclose an LCD having reflection electrodes composed of aluminum (col. 14, lines 54-56). Therefore, one of ordinary skill in the art would have recognized to have used aluminum as the material of the reflective pixel electrode of Kurogane et al. since it is notoriously well known to use aluminum as the material of the reflective pixel electrode in LCDs as taught by Mitsui et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used aluminum as the material of the reflective pixel electrode of Kurogane et al. since it is notoriously well known to use aluminum as the material of the reflective pixel electrode in LCDs as taught by Mitsui et al.

In regard to claim 4, Kurogane et al. fail to teach that the interlayer insulator comprises a photosensitive resin. Mitsui et al., however, disclose an LCD having an insulating film that

comprises a photosensitive resin (col. 6, lines 6-19 and 54-68). Therefore, one of ordinary skill in the art would have recognized to have included a photosensitive resin in the interlayer insulator of Kurogane et al. since it is notoriously well known to include a photosensitive resin in the insulating layer of LCDs as taught by Mitsui et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a photosensitive resin in the interlayer insulator of Kurogane et al. since it is notoriously well known to include a photosensitive resin in the insulating layer of LCDs as taught by Mitsui et al.

In regard to claim 5, Kurogane et al. fail to explicitly teach that the interlayer insulator comprises a polymeric resin. Mitsui et al., however, teach a liquid crystal display device with an insulating film composed of high molecular resin (col. 5, lines 14-16). Therefore, one of ordinary skill in the art would have recognized to have used a high molecular resin (i.e. a polymeric resin) as an interlayer insulator material of Kurogane et al., since polymeric resin is a notoriously well known insulating film material, as taught by Mitsui et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a high molecular resin (i.e. a polymeric resin) as an interlayer insulator material of Kurogane et al., since polymeric resin is a notoriously well known insulating film material, as taught by Mitsui et al.

16. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurogane et al.

Kurogane et al. teach the LCD as discussed above. Kurogane et al. fail to teach that the film comprising molybdenum nitride has a nitrogen content between 5 atomic % and 30 atomic %. However, Kurogane et al. teach the variation of ratio of flow rate of N_2/Ar during the Mo

film deposition in order to vary the resistance of the film comprising molybdenum nitride (col. 4, lines 51-62 and col. 8, line 63-col.9, line 3). One of ordinary skill in the art would have recognized to tailor the nitrogen concentration in the film comprising molybdenum nitride via variation in the processing parameters during nitrogen deposition into the Mo film in order to achieve the desired properties, such as resistance, depending on the desired end-use result.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have tailor the nitrogen concentration in the film comprising molybdenum nitride via variation in the processing parameters during nitrogen deposition into the Mo film, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art in the absence of unexpected results. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

17. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsui et al. in view of Kurogane et al.

In regard to claims 7 and 9, Mitsui et al. teach a liquid crystal display having a liquid crystal layer (item 49) between two substrates (items 31 and 45) (col. 10, lines 13-17 and Figure 5). Mitsui et al. also teach that the liquid crystal display has reflection electrodes (item 38) that are composed of aluminum formed on the insulating film (item 42) (col. 9, lines 65-68 and Figure 5). Mitsui et al. further teach a laminated layer provided on at least one of the substrates wherein the laminated layer comprises an insulating film (item 42, col. 9, lines 53-55 and Figure 5). Mitsui et al. further teach that the insulating layer (item 42) is located at least partially over the address lines (item 39) of the LCD (col. 9, lines 43-48) as shown in Figure 6. The reflective metal film (item 38) of Mitsui et al. necessarily has a light reflecting function and is provided in

at least one pixel region of the display for contributing to displaying of images in the display wherein the reflective metal film is formed on the laminated layer as shown in Figure 5.

Mitsui et al. fail to teach a film comprising molybdenum nitride laminated to and over at least part of the insulating film so that the film comprising molybdenum nitride contacts the insulating film and also fails to teach that the reflective metal film is formed on the laminated layer so as to contact the film comprising molybdenum nitride.

Kurogane et al., however, teaches an LCD comprising a double-layer conductive film (col. 3, lines 4-10) comprising molybdenum nitride (source/drain electrode line, item 10, composed of aluminum alloy metal film, item 8, and molybdenum nitride film, item 9) laminated to and over at least part of the insulating film (interlayer insulator, item 6), so that the film comprising molybdenum nitride contacts the insulating film, and also teaches that the pixel electrode is formed on the laminated layer so as to contact the film comprising molybdenum nitride (item 13, Fig. 1). Kurogane et al. teach that the double-layer conductive film (col. 3, lines 4-10) comprising molybdenum nitride serves as a source/drain electrode line (col. 3, lines 43-46). Therefore, one of ordinary skill in the art would have recognized to have used the double-layer conductive film comprising molybdenum nitride that contacts the insulating film and pixel electrode taught by Kurogane et al. as the source/drain electrode line of Mitsui et al. since it is notoriously well known to use a double-layer conductive film comprising molybdenum nitride as an LCD source/drain electrode line as taught by Kurogane et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the double-layer conductive film comprising molybdenum nitride that contacts the insulating film and pixel electrode taught by Kurogane et al. as the source/drain

electrode line of Mitsui et al. since it is notoriously well known to use a double-layer conductive film comprising molybdenum nitride as an LCD source/drain electrode line as taught by Kurogane et al.

In regard to claim 8, Mitsui et al. and Kurogane et al. teach the LCD as discussed above. Mitsui et al. and Kurogane et al. fail to teach that the film comprising molybdenum nitride has a nitrogen content between 5 atomic % and 30 atomic %. However, Kurogane et al. teach the variation of ratio of flow rate of N_2/Ar during the Mo film deposition in order to vary the resistance of the film comprising molybdenum nitride (col. 4, lines 51-62 and col. 8, line 63-col.9, line 3). One of ordinary skill in the art would have recognized to tailor the nitrogen concentration in the film comprising molybdenum nitride via variation in the processing parameters during nitrogen deposition into the Mo film in order to achieve the desired properties, such as resistance, depending on the desired end-use result.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have tailor the nitrogen concentration in the film comprising molybdenum nitride via variation in the processing parameters during nitrogen deposition into the Mo film, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art in the absence of unexpected results. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

In regard to claim 10, Mitsui et al. fail to teach that the LCD further comprises an electrode comprising ITO formed on the same substrate on which the reflective metal film is formed wherein the film comprising molybdenum nitride is provided at least partially between the reflective metal film and the electrode comprising ITO. However, Kurogane et al. teach an

LCD comprising an ITO electrode (col. 1, lines 13-16 and col. 6, lines 7-11 and item 13, Fig. 1) formed on the same substrate on which the reflective metal film (aluminum alloy metal film, item 8) is formed, wherein the molybdenum nitride layer (item 9) is provided between the reflective metal film (item 8) and the electrode comprising ITO (item 13). Therefore, one of ordinary skill in the art would have recognized to have provided the molybdenum nitride layer of Mitsui et al. and Kurogane et al. between a reflective metal film (item 8) and an electrode comprising ITO, since it is notoriously well known to do so as taught by Kurogane.

18. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurogane et al. in view of Mitsui et al.

Kurogane et al. teach an LCD comprising at least one thin film transistor (TFT), an insulating layer, at least one reflective pixel electrode defining at least part of a pixel of the LCD, and a film comprising molybdenum in direct contact with the underside of the reflective pixel electrode, so that the film comprising molybdenum is in direct contact with the underside of the reflective pixel electrode and an upper surface of the insulating layer (see Fig. 1) as discussed above. Kurogane et al. fail to explictly teach that the insulating layer is at least partially provided over address lines of the LCD, at least some of the address lines being in communication with the TFT. Mitsui et al., however, teach an LCD having an insulating layer (item 42) located at least partially over the address lines (item 39) of the LCD (col. 9, lines 43-48) as shown in Figure 6, where at least some of the address lines are in communication with the TFT. Therefore, one of ordinary skill in the art would have recognized to have provided the insulating layer of Kurogane et al. at least partially over the address lines of the LCD of Mitsui et al. where at least

some of the address lines are in communication with the TFT since it is notoriously well known to do so as taught by Mitsui et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided the insulating layer of Kurogane et al. at least partially over the address lines of the LCD of Mitsui et al. where at least some of the address lines are in communication with the TFT since it is notoriously well known to do so as taught by Mitsui et al.

ANSWERS TO APPLICANTS ARGUMENTS

19. Applicant's arguments on pages 7-8 of Paper #10 regarding the 35 U.S.C. 102(e) rejection of claim 1 as anticipated by Kurogane et al. (Paper #7, paragraph 5) are rendered moot due to the new 35 U.S.C. 102(e) rejection of claim 1 as anticipated by Kurogane et al. as necessitated by amendment.

Kurogane et al. does indeed teach a *film comprising molybdenum nitride* which is in contact with both the reflective pixel electrode and the interlayer insulator as made of record in the new 35 U.S.C. 102(e) rejection of claim 1 as anticipated by Kurogane et al. made of record in this Paper (#11). In response to Applicant's argument that Kurogane et al. fails to disclose or suggest providing a layer comprising MoN directly between and contacting an LCD's reflective pixel electrode and an underlying insulating layer, the limitations on which the Applicant relies are not stated in the claims. It is the claims that define the claimed invention, and it is the claims, not specifications that are anticipated or unpatentable. *Constant v. Advanced Micro-Devices Inc.*, 7 USPQ2d 1064. In response to Applicant's argument that "Kurogane fails to disclose or suggest providing a MoN layer directly between Kurogane's pixel electrode 13 and insulating

layer 11', the MoN layer (item 9) taught by Kurogane is indeed between pixel electrode 13 and insulating layer 11 at both sides of source/drain electrode line (item 10) as shown in Figure 1. Kurogane does not teach away from what is claimed; regardless of the location within the TFT, the MoN film is nonetheless between the interlayer insulator (item 6) and the reflective pixel electrode (item 13). Examiner does not rely on layer 11 as the "interlayer insulator" (as claimed) as Applicant seems to think; the "interlayer insulator" is layer 6, as is clearly established by Kurogane.

20. Applicant's arguments on pages 9-11 of Paper #10 regarding the 35 U.S.C. 103 rejection of claim 7 over Mitsui et al. in view of Kurogane et al. (Paper #7, paragraph 9) are rendered moot due to the new 35 U.S.C. 103 rejection of claim 7 over Mitsui et al. in view of Kurogane et al. as necessitated by amendment.

The cited art does indeed teach the limitations added to claim 7 contrary to Applicant's assertion that the cited art does not disclose or suggest the added limitations. Examiner agrees with Applicant that "there is no ITO connection with reflective pixel electrodes 38 of Mitsui et al.; the initial basis for the rejection of claim 7 over Mitsui et al. in view of Kurogane et al., "in order to prevent corrosion that occurs during deposition of an ITO film at the contact hole" as cited by Applicant, has been withdrawn.

In regard to Applicant's assertion that "Kurogane's teaching for combining Al and Mo is in the context of address lines–not pixel electrodes of an LCD" is a matter of intended use; it has been held that a recitation with respect to the manner in which a claimed article is intended to be employed does not differentiate the claimed article from a prior art article satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQd 1647 (1987).

In response to Applicant's argument that there is no suggestion to combine the references since Kurogane uses MoN to supress the occurence of Al bumps while Mitsui teaches bumps formed in the electrode 38 in Figure 5, the Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. *In re* Nomiya, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. *In re* McLaughlin, 170 USPQ 209 (CCPA 1971). References are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. *In re* Bozek, 163 USPQ 545 (CCPA 1969). Mo is not used by Kurogane solely to suppress Al bumps as Applicant seems suggest (see col. 1, lines 46-51) as cited by Applicant ("Moreover..."). One of ordinary skill in the art would have been motivated to combine the references since the conductive double layer structure of Al and MoN layers is established as an effective material for use as an electrode in TFTs used in LCDs.

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter B Aughenbaugh whose telephone number is 703-305-4511. The examiner can normally be reached on Monday-Friday from 9:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on 703-308-4251. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

wba
04/18/03 WBA

HAROLD PYON
SUPERVISORY PATENT EXAMINER
1772

4/21/03